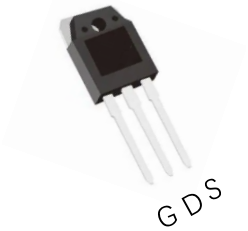
600V 30A 0.2Ω N-ch Power MOSFET

Description

WMOS D1 is Wayon's 1st generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

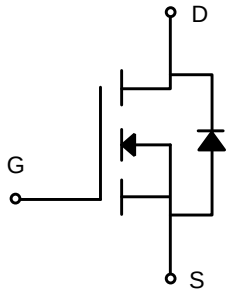
TO-3P



Features

- Typ.$R_{DS(on)}$=0.2Ω@V_{GS}=10V
- 100% avalanche tested
- RoHS Complian

RoHS compliant



Applications

- SMPS
- Charger
- DC-DC

Absolute Maximum Ratings (Tc=25℃)

Parameter	Symbol	WMI30N60D1	Unit
Drain-source voltage	V_{DSS}	600	V
Gate-source voltage	V_{GS}	±30	V
Continuous drain current	I_D	30	A
Pulsed drain current [1]	I_{DM}	120	A
Avalanche energy, single pulse [2]	E_{AS}	1280	mJ
Power dissipation	P_D	521	W
Derate above 25°C		4.2	W/℃
Operating junction temperature	T_j	-55~150	℃
Storage temperature	T_{stg}	-55~150	℃
Continuous diode forward current	I_S	30	A
Diode pulse current [1]	I_{Spulse}	120	A

Thermal Characteristic

Thermal resistance,junction-to-case	$R_{\theta JC}$	0.2	℃/W
Thermal resistance,junction-to-ambient	$R_{\theta JA}$	50	℃/W

Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source break down voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	T_J=25℃	600	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}=V_{GS}	T_J=25℃	2	-	4	V
Drain-source leakage current	I_{DSS}	V_{DS}=500V, V_{GS}=0V	T_J=25℃	-	-	1	μA
		V_{DS}=400V, V_{GS}=0V	T_J=125℃	-	-	100	μA
Gate-source leakage current,forward	I_{GSSF}	V_{DS}=0V, V_{GS}=30V	T_J=25℃	-	-	100	nA
Gate-source leakage current,reverse	I_{GSSR}	V_{DS}=0V, V_{GS}=-30V	T_J=25℃	-	-	-100	nA
Drain-source on-state resistance [3]	$R_{DS(ON)}$	V_{GS}=10V, I_D=15A	T_J=25℃	-	0.2	0.3	Ω
Transconductance [3]	G_{fs}	V_{DS}=20V	T_J=25℃	-	38	-	S

Dynamic Characteristics of MOSFET (T_C=25℃)

			Min.	Typ.	Max.	
Input capacitance	C_{iss}	f=1MHz, V_{DS}=25V, V_{GS}=0V	-	5280	-	pF
Output capacitance	C_{oss}		-	385	-	pF
Reverse transfer capacitance	C_{rss}		-	27	-	pF
Gate to source charge	Q_{gs}	V_{DD}=300V	-	28	-	nC
Gate to drain charge	Q_{gd}	I_D=30A	-	21	-	nC
Total gate charge	Q_g	V_{GS}= 0 to10V	-	94	-	nC

Switching Characteristics of MOSFET (T_C=25℃)

			Min.	Typ.	Max.	
Turn-on delay time	$t_{d\ on}$	V_{DS}=300V, I_D=30A, R_G=25Ω, V_{GS}=0 to 10V	-	57	-	ns
Rise time	t_r		-	103	-	ns
Turn-off delay time	$t_{d\ off}$		-	278	-	ns
Fall time	t_f		-	128	-	ns

Characteristics of Body Diode (T_C=25℃)

			Min.	Typ.	Max.	
Forward voltage	V_{SD}	I_{SD}=25A, V_{GS}=0V	-	-	1.5	V
Reverse recovery time	t_{rr}	V_{DS}=300V, I_S=30A, V_{GS}=10V -di/dt=100A/μs	-	280	-	ns
Reverse recovery current	I_{rr}		-	12	-	A
Recovery charge	Q_{rr}		-	1.7	-	μC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$ =150°C.
2. The E_{AS} data shows Max. rating . The test condition is V_{DD} =50V, V_{GS} =10V, L=10mH, I_{AS} =16A,Tc=25℃.
3. The data tested by pulsed , pulse width ≤ 300μs , duty cycle ≤ 2%.

TYPICAL CHARACTERISTICS

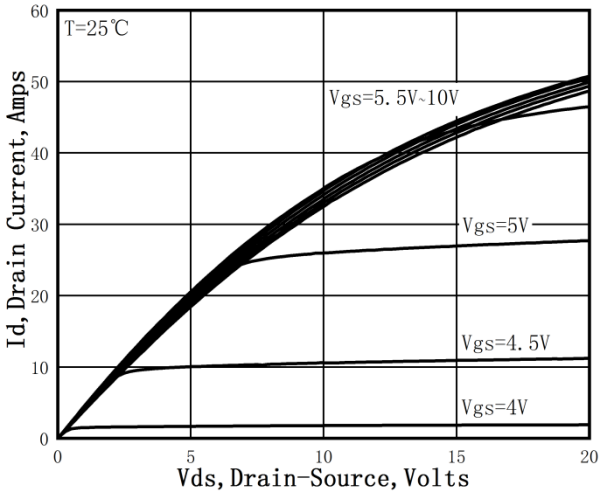


Figure 1.On-Region Characteristics

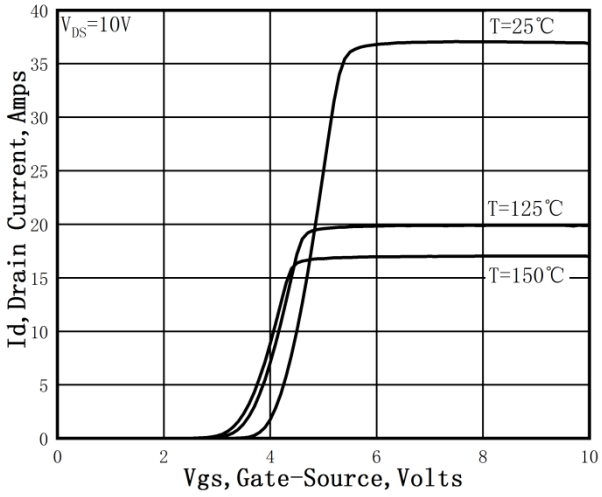


Figure 2. Transfer Characteristics

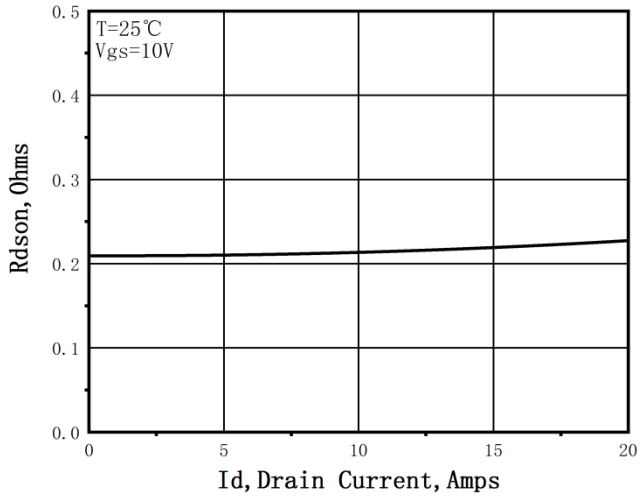


Figure 3.Static Drain-Source On Resistance

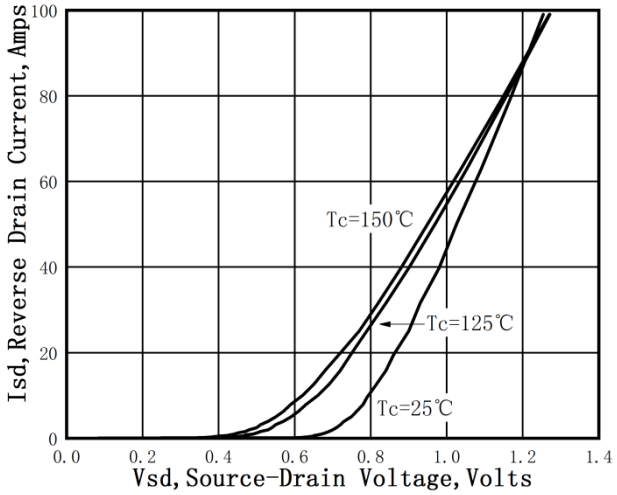


Figure 4. Typical Body Diode Transfer Characteristics

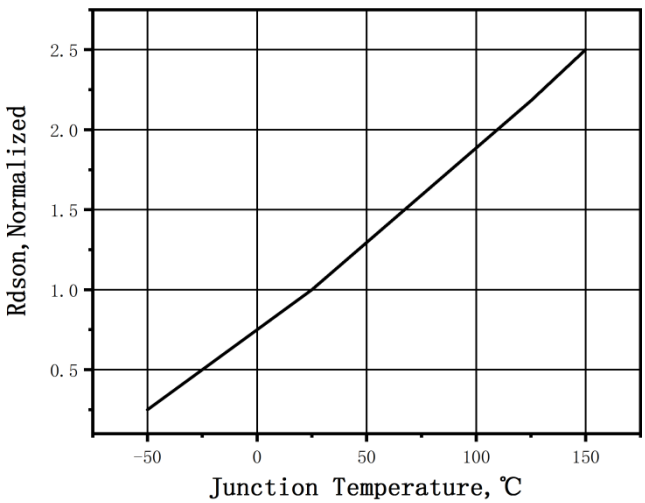


Figure 5. Normalized $R_{DS(on)}$ vs.Temperature

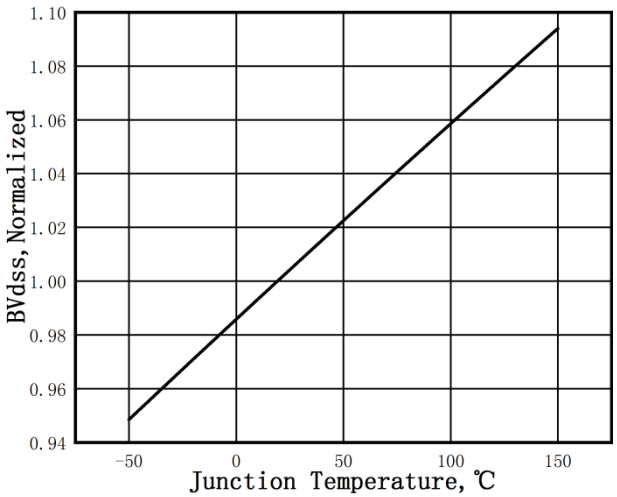


Figure 6. Normalized BV_{DSS} vs.Temperature

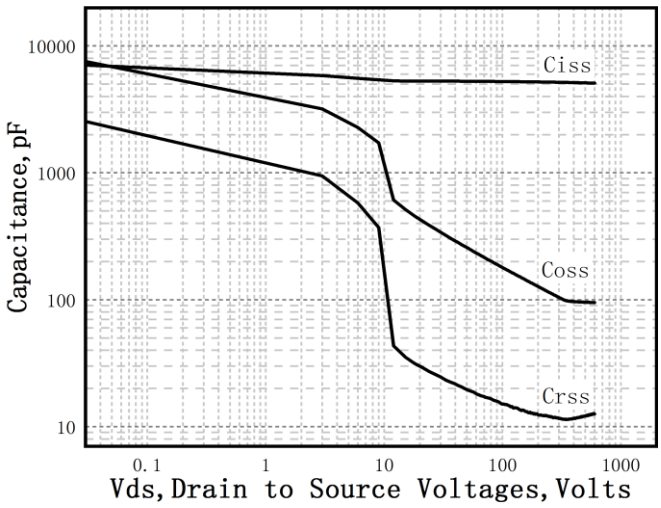


Figure 7. Capacitance Characteristics

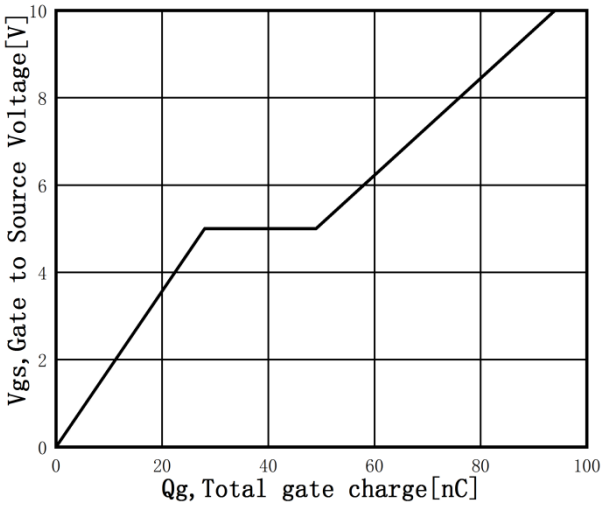


Figure 8. Gate Charge Characteristics

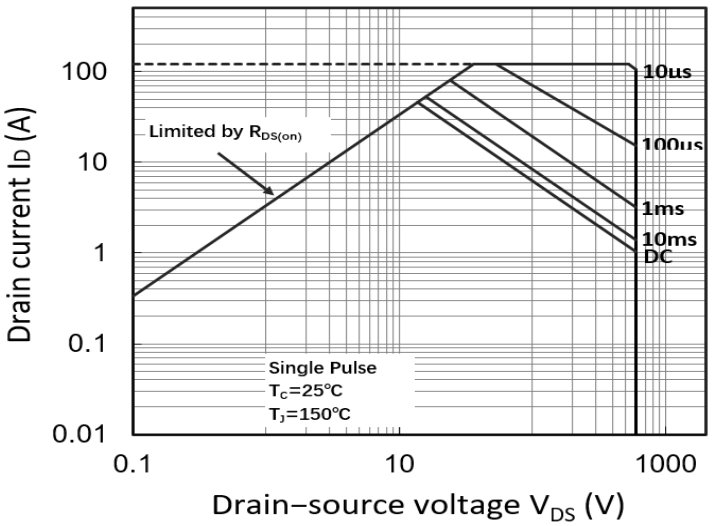


Figure 9. Maximum Safe Operating Area

(TO-3P)

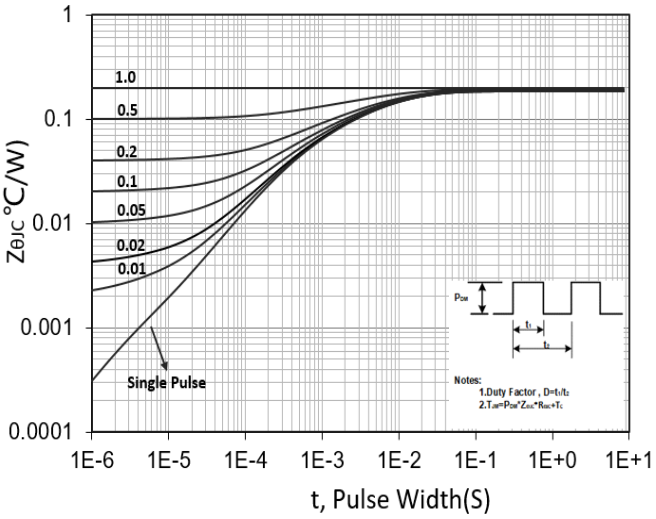
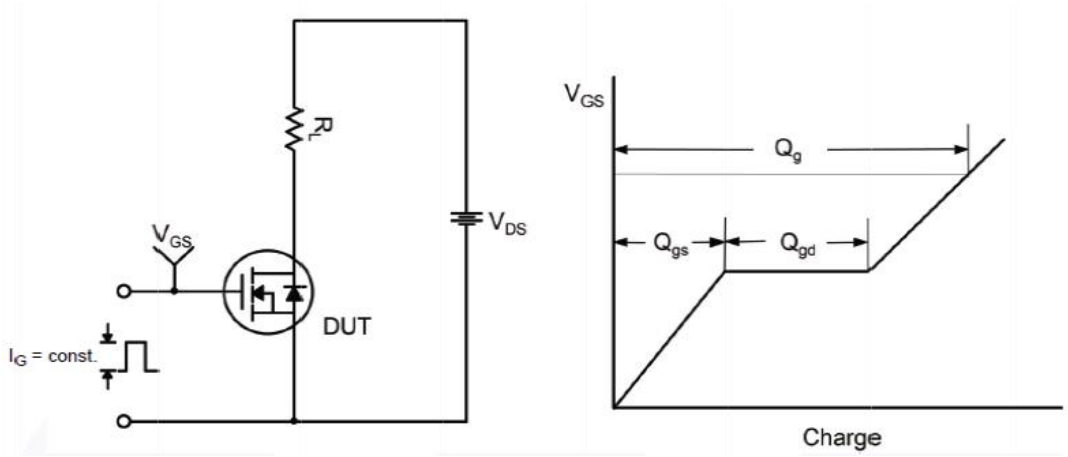


Figure 10. Transient Thermal Response Curve

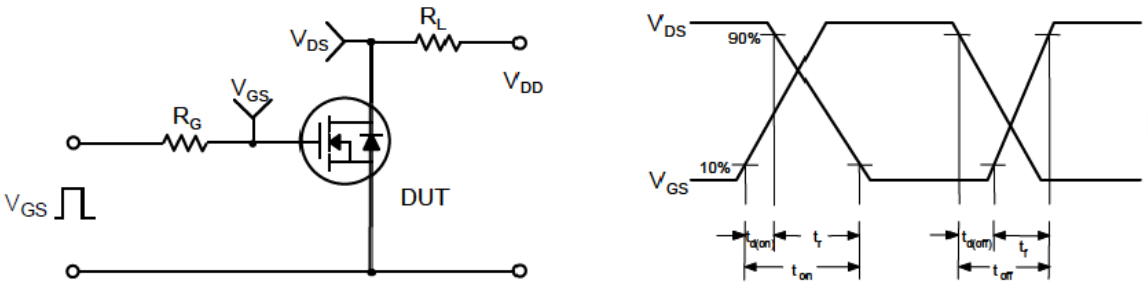
(TO-3P)

Test Circuit

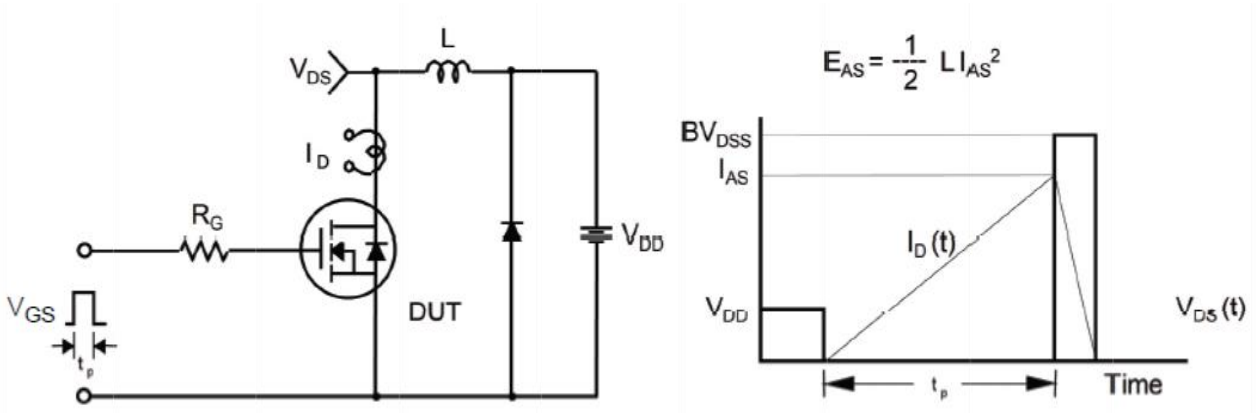
Gate Charge Test Circuit &Waveform



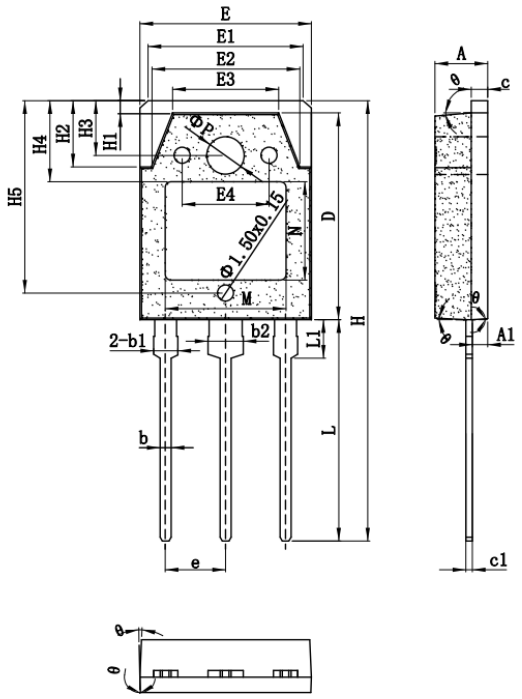
Switching Test Circuit &Waveforms



Unclamped Inductive Switching Test Circuit &Waveforms



Mechanical Dimensions for TO-3P



SYMBOL	mm		
	MIN	NOM	MAX
✱A	4.65	4.80	4.95
✱A1	1.40	1.50	1.60
✱b	0.80	1.00	1.20
✱b1	1.90	2.10	2.30
✱b2	2.90	3.10	3.30
✱c	1.45	1.50	1.55
✱c1	0.50	0.60	0.65
✱D	17.70	18.70	19.70
D1	6.70	6.90	7.10
D2	16.60	16.80	17.00
✱E	15.45	15.60	15.75
E1	13.65	13.80	13.95
E2	13.35	13.50	13.65
E3	9.50	9.65	9.80
E4	7.75	7.90	8.05
E5	13.40	13.55	13.70
✱H	39.80	40.00	40.20
H1	0.90	1.10	1.30
H2	5.80	6.00	6.20
H3	4.75	4.95	5.15
H4	7.15	7.35	7.55
H5	17.30	17.50	17.70
✱L	19.70	20.00	20.30
✱L1	3.40	3.55	3.70
M	10.85	11.00	11.15
N	8.70	8.90	9.10
✱e	5.40	5.44	5.48
✱ΦP	3.25	3.40	3.55
✱ΦP1	3.00	3.15	3.30
ΦP2	6.70	6.90	7.10
θ	3°	5°	7°

Ordering Information

Part	Package	Marking	Packing method
WMI30N60D1	TO-3P	WMI30N60D1	Tube

Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207

Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: **http://www.way-on.com**

For additional information, please contact your local Sales Representative.

Product Specification Statement

1.The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2.The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

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